

Application No.: 10/676060

Docket No.: IIW-032

REMARKS

Applicants amend claims 1-3 to clarify the claimed invention and added new dependent claims 4-5. No new matter is added. Support for the claim amendment can be found throughout the application and at least at Page 3, lines 10-18, Page 5, line 23 to Page 6, line 2, Page 16, lines 11-22, Page 17, lines 14-25, Page 18, lines 1-7, Fig. 2, 7-9. Upon entry of this amendment, claims 1-5 are pending, of which claims 1-3 are independent. Applicants thank the Examiner for having a telephone conference with the Applicants' attorney. Applicants respectfully submit that the claim amendments further clarify the claimed invention and the pending claims define over the art of record.

The Claimed Invention

The claimed invention provides a processing circuit that can process electrical output signal (such as voltage) of each of the plurality of cells in a fuel cell stack. Each separator has a terminal protruding from one end of the separator and the terminal is used to lead voltages generated from a single cell. See Page 7, lines 5-6. The separators are stacked such that all the terminals are on the *same side* of the fuel cell stack. See Fig. 2. Each of the terminals is connected to a connector that is further connected with a circuit board. See Fig. 2. The connector has multiple slots that *encloses* the terminals so that the terminals are reliably connected with the connectors solving the prior art problems of terminal breakage and poor connection between the terminals and connectors. See Page 3, lines 10-18 and Page 18, 1-7.

In one embodiment of the present invention, multiple terminal clusters are formed by the multiple terminals on the *same side* of the fuel cell stack. See, Fig. 5 and 6. Furthermore, a connector module is provided for each terminal cluster. The multiple connector modules are positioned to be *reversely directed* at each other on the same side of the fuel cells tack. See Fig. 5-6. Hence, the fuel cell stack can be made small and compact.

In another embodiment of the present invention, a fuel cell stack is formed by multiple clusters of cells, where each cluster of cells includes multiple cells. The fuel cell stack further includes a plurality of separators, where each of the separators has a terminal protruding from one end of the corresponding separator and two adjacent separators sandwich a cell. One or more

Application No.: 10/676060

Docket No.: IIW-032

sheet form bodies (such as stopper 21) that are separate and distinct from the separators are also included in the fuel cell stack. Each sheet form body is inserted between two adjacent clusters of cells. A connector component provided with *each cluster of cells* and having a connector that connects with the terminals of the separators is also included in the fuel cell stack. The connector component is further *fixed on the one or more sheet form body*. Hence, the connector components can be easily secured on the fuel cell stack and the entire fuel cell structure is kept compact.

The claimed invention has the advantage that the connectors are easy to add and handle and the fuel cell is still compact. The claimed invention also has the advantage that the terminals are reliably connected with the connectors solving the prior art problems of terminal breakage and poor connection between the terminals and connectors.

Rejection of Claims 1-3 under 35 U.S.C. §102

Claims 1-3 are rejected under 35 U.S.C. §102(b) as being anticipated by EP 1,001,666 to Einhart et al. (hereafter "Einhart"). Applicants respectfully traverse this rejection.

The Einhart Reference

The Einhart reference discloses that a contacting device 100 includes a carrier layer 102 and multiple electrically conductive regions 106. See Col. 4, lines 42-45 and Fig. 1. The conductive regions are in contact with two separators 114. See Fig. 1. However, none of the separators 114 have a terminal that protrudes from the separator. The Einhart reference also does not disclose that the separators are stacked such that all the terminals are on the same side of the fuel cell stack and protruding from the same side of the fuel cell stack, as required by amended claim 1. The Einhart reference discloses that carrier layer 102/202 with conductive regions 106/206 are connected with the separators. See Fig. 1-2. However, the Einhart reference does not disclose a connector with a plurality of slots that *encloses* the terminals that protrude from the separators, as required by amended claim 1. Hence, the fuel cell in the Einhart reference may experience poor connection and/or terminal breakage, which is the problem the claimed invention tries to solve in the prior art.

Application No.: 10/676060

Docket No.: IIW-032

In Fig. 4, the Einhart reference discloses two different embodiments of a face of a contacting device. Referring back to the contacting device 100, the narrower end of Fig. 4 is referring to contacting region 106 that makes contact with the separators 114, the equivalent of connector portion, whereas the wider end of Fig. 4 referring to carrier layer 102, the equivalent of main body portion. Hence, the narrower end is the connector portion whereas the wider end is the main body portion. In other words, Einhart discloses a contacting device with the main body portion with a larger width than the connector portion. Hence, the Einhart reference does not disclose a connector module with a main body portion smaller in width than the connector portion, as required by amended claim 2. The Einhart reference further does not disclose the limitation that the plurality of connector modules are positioned to be reversely directed at each other on the same side of the fuel cell, as required by claim 2. Only one of the contacting devices 100, 200, 400, is provided on one side of the fuel cell stack; hence, there cannot be multiple connector modules so positioned to be reversely directed at each other on the same side of the fuel cells stack.

Claim 3 requires the limitations of one or more sheet form bodies that are separate and distinct from the separators to be inserted between adjacent clusters of cells. In other words, claim 3 requires both separators and a sheet form body. However, nowhere in the Einhart reference does it disclose a sheet form body that is inserted between clusters of cells. Claim 3 further requires that a connector component is provided with each cluster of cells and fixed on the sheet form body. The Einhart reference also does not disclose this limitation.

As set forth above, the Einhart reference does not disclose each and every element and limitation of claims 1-3. Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 1-3.

Rejection of Claims 2-3 under 35 U.S.C. §102

Claims 2-3 are rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 4,310,605 to Early et al. (hereafter "Early"). Applicants respectfully traverse this rejection.

Application No.: 10/676060

Docket No.: IIW-032

The Early Reference

The Early reference discloses a fuel cell module including sub-stacks of series-connected fuel cells. Each sub-stack 10 includes six fuel cells and an intermediate bipolar plate 30 is disposed between two fuel cells 20. See Fig 1. and Col. 2, lines 33-34. Cold plates 40 and 42 are provided in between two adjacent sub-stacks. See Figs. 1 and 3. Cold plates 40, 42 and associated manifolds 54, 56, and 64, 66 provide means for tapping the voltage of a fuel cell module. Manifolds 54, 56, 64, 66 are long tube structures that run along a side of the fuel cell module. See Figs. 1 and 3. Tubes 48 are mounted on each of the cold plates to connect with the manifolds 54, 56, and 64, 66. See Fig. 3 and Col. 3, lines 63 to Col. 4 line 4. Connections 70 and 72 are used to collect current and connected with manifolds 54, 56, and 64, 66. See Fig. 3 and Col. 4, lines 56-Col. 5, lines 69.

Claim 2 requires that each connector module has a same shape and a main body portion smaller in width than the connector portion, which is also not disclosed by the Early reference. None of the connections 70, 72 and manifolds 54, 56, 64, 66 has a main body portion smaller in width than the connector portion. Even if connections 70 is combined with manifolds 54, 56 to form a connector module, then the connector module is not formed in the same shape, but rather a mirror shape, as the one formed by combining connections 72 and manifolds 64, 66. Claim 2 further requires the limitation that the each of the connector modules has a unified connector that connects with each terminal in one of the terminal clusters. In contrast, the Early reference does not disclose a connector module having a unified connector to connect to terminal clusters. Hence, the fuel cell of the Early reference cannot be made compact and the tubes 48 can be easily broken.

Claim 3 requires that a connector component be provided with *each* cluster of cells and has a connector that is connected with the terminals of the separators, where the connector component is fixed on a sheet form body that is separate and distinct from the separators. In contrast, the Early reference discloses manifolds 54, 56, 64, 66 that connects with each of the cold plates 40 and 42 via tubes 48 but does not disclose anything that connected to terminals of the separators (bipolar plates 30). Furthermore, manifolds 54, 56, 64, 66 are provided for the entire fuel cells tack and not provided with each cluster of cells (sub-stacks) as required by claim

Application No.: 10/676060

Docket No.: ITW-032

3.

Accordingly, the Early reference does not disclose each and every element and limitation of claims 2 and 3. Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 2 and 3.

New Claims

New dependent claims 4 and 5 are added. Applicants note that the dependent claims also recite patentable subject matter. Accordingly, Applicants respectfully submit that the new claims also define over the art of record.

Application No.: 10/676060

Docket No.: IIW-032

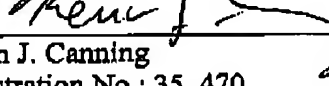
CONCLUSION

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

Applicants submit herewith a request for two-month extension of time. Applicants believe no other fee is due with this statement. However, if additional fee is due, please charge our Deposit Account No. 12-0080, under Order No. IIW-032 from which the undersigned is authorized to draw.

Dated: May 15, 2006

Respectfully submitted,

By 
Kevin J. Canning
Registration No.: 35, 470
LAHIVE & COCKFIELD, LLP
28 State Street
Boston, Massachusetts 02109
(617) 227-7400
(617) 742-4214 (Fax)
Attorney For Applicant